

REMARKS

Summary Of The Office Action & Formalities

Status of Claims

By this Amendment, Applicant is amending claims 30, 32, 39, 46-47 and 50, canceling claims 31, 36, 38, 51 and 58, and adding new claims 59 and 60.

Specifically, independent claims 30 and 50 are amended to recite that the reference agent and buffering agent are “added to” the test solution in situ. Support is found, for example, at page 7, lines 21-28. Claim 30 is further amended by incorporating subject matter from claim 31. Claim 50 is further amended by incorporating subject matter from claim 51.

Claim 39 is amended to recite that the sensor is caused to function as steady-state potentiostat, as supported by, for example, page 17, lines 1-2.

Claims 46 and 47 are amended to depend from claim 30.

New claims 59 is supported, for example, by the disclosure at page 17, lines 1-2.

New claim 60 is supported, for example, by the disclosure at page 7, lines 9-11.

No new matter is added.

Claim to Foreign Priority

Applicant thanks the Examiner for acknowledging the claim to foreign priority.

However, the Examiner indicates that a certified copy of the priority document, GB 0208095.0 filed in Great Britain on April 9, 2002, has not been received. In this regard, Applicants note that the present application is a National Stage Application of PCT/GB/03/01383 and it is customary for the U.S. Patent and Trademark Office, as a Designated Office, to request the International Bureau to furnish the copy of the certified priority document upon receipt of Applicant's submission under 35 U.S.C. §371 to enter the U.S. national phase. See MPEP §

18903.03(c)(II). Thus, Applicants respectfully request the US PTO to request the certified copy of the priority document.

Information Disclosure Statement

The Examiner states that the Information Disclosure Statement filed October 8, 2004 fails to comply with 37 CFR 1.98(a)(2). The Examiner asserts that the Foreign Patent references and the Non-Patent Literature references were not considered because copies of these references were not supplied.

Applicants note that it is customary for the International Bureau to provide copies of the references cited on the International Search Report (ISR). However, Applicants will provide copies of the references cited in the IDS filed with the Application on October 8, 2004.

Art Rejections

1. Claims 30-32, 36-39, 41, 43, 44, 49-51, 57 and 58 are rejected under 35 U.S.C. § 102(b) as being anticipated by WILLIAMS et al (WO 95/04271, hereinafter “WO ‘271).
2. Claims 33-35, 40, 42 and 52-56 are rejected under 35 U.S.C. § 103(a) as being unpatentable over WO ‘271
3. Claims 45-48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over WO ‘271 in view of BOHS et al (US 5,399,256, hereinafter, US ‘256).

Applicant respectfully traverses.

Applicants' Response

Novelty and Inventive Step

Independent claims 30 and 50 are amended herein as set forth above.

The present invention is characterized in that it creates an effective silver/silver chloride reference system in situ by addition of sodium chloride to the solution. In a preferred embodiment, a substantial excess of sodium chloride is added (as specified for example in claim 18).

This presents the apparatus and method of the invention with a number of distinct features. First, the electrodes are all of the same material, being all substantially pure silver. There is no need to provide a silver chloride reference electrode. Instead, a substantially pure silver electrode is provided, but the same effective chemistry is generated in situ by the addition of sodium chloride to the solution under test. Second, the ability to add sodium chloride at a significant excess to raise chloride levels in the resultant test mixture above those that would be encountered in any practical sample, whether from fresh, brackish or sea water, means that the same apparatus and method can be used without specific calibration for all such solutions. The system is in effect self referencing, it does not need to be referenced and pre-calibrated in accordance with Cl^- levels in individual solutions in conventional manner, but simply references itself to monitor the level of the desired target species. Third, as a practical consequence of this, the system operates with a quiescent sample.

In a preferred embodiment, a sample is placed on the sample collection area, mixed with the reference and buffer solution, and is then measured in a static state as in new claim 60.

To the extent that WO '271 and US '256 disclose specific reference electrodes, which are intended to serve as reference electrodes based on a silver/silver chloride system, these reference

electrodes are clearly described as silver chloride electrodes of conventional design rather than as substantially pure silver.

To the extent that buffering and other re-agents are added, they are not added for the purpose of creating a silver/silver chloride reference circuit from a substantially pure silver reference electrode. Furthermore, they are not added to produce a substantial excess of Cl^- ions so as to make the system in effect self referencing, and applicable to a range of sample sources from fresh to salt water. Indeed, since each of the prior art references involves at the very least a shaken sample, if not a flowing sample, rather than a quiescent sample retained on a sample collection area, such an approach would not have even been considered or suggested as appropriate.

Specifically, none of the prior art documents describes an electrode system with at least three electrodes which are all of identical material, and all of metallic silver in substantially pure form. The cited references relate to conventional systems involving dissimilar electrodes and/or a silver chloride reference electrode. For example, WO '271 describes possible electrode systems at page 14, lines 17 to 21, and at page 25, lines 24 to 27, but in each case the electrodes are dissimilar, and a silver chloride reference electrode is preferred.

US '256 describes a silver chloride reference electrode (see column 10, lines 53 to 54), preferably with dissimilar working electrodes. US '256 does not suggest using a pure silver electrode and generating the reference system in situ by addition of a sodium chloride reference agent.

Some further differences which represent the difference in approach illustrated by WO '271 and US '256 can be identified. WO '271, for example, involves a vibration of the electrode system, and the application of sinusoidal high frequency currents in order to make a

measurement. In a preferred embodiment (see page 24) it is suggested that a combined reference and counter electrode could be used. This is fundamentally at odds with the approach of the present invention and would make it impossible to generate the in-situ reference envisaged by the present invention.

US '256 is a flow through system rather than a system for analyzing a small quiescent sample on the active area. It is a fixed system and could not be handheld. The present invention is directed to a system which lends itself for use in the field with small quiescent samples.

For all these reasons, the method of the invention as described in the amended independent claim can be demonstrated to be novel and constitutes an inventive step over the conventional prior art systems described in the three prior art documents. Moreover, it follows that the material and reagent selections described in the independent apparatus claim are no mere arbitrary choice, but are fundamental to the method. The material and reagent selections would not be relevant to prior art systems, would in many instances not work with or at least confirm no advantages to, prior art systems such as flow-through systems, and therefore also constitute an inventive step.

Since the independent claims are considered inventive, it follows the claims dependent thereon are also considered inventive. Additionally, a particular point to be emphasized in accordance with the invention is that it is intended to be used with a small, static quiescent sample to which the reference agent is added. This presents fundamentally different consideration to those of bulk or flow-through systems.

Accordingly, the presently claimed invention is not anticipated nor rendered obvious by the cited references.

Withdrawal of the art rejections is respectfully requested.

New Claims

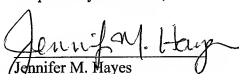
For additional claim coverage merited by the scope of the invention, Applicant is adding new claims 60 and 61, which are directed to preferred embodiments of the claimed method wherein the electrode is connected to a power source to set up a control circuit which is a potentiostatic steady state type circuit and wherein the method further comprises the steps of taking a test sample of a quantity of a few millimeters from a bulk sample to be tested and placing the test sample on the sample collection area for testing as a static sample, respectively.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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